

Arizona.—22d, 26th, 27th, 29th, 30th.
Arkansas.—27th.
California.—2d, 4th, 22d, 23d, 25th, 26th to 31st.
Colorado.—23d, 29th.
Connecticut.—1st, 2d, 31st.
Dakota.—1st, 23d to 27th, 29th.
Delaware.—2d, 3d.
District of Columbia.—1st, 3d, 22d, 27th, 28th.
Florida.—2d, 23d, 26th, 27th, 28th.
Georgia.—2d, 22d, 27th, 29th.
Illinois.—2d, 9th, 22d, 23d, 27th, 29th, 31st.
Indiana.—2d, 3d, 4th, 9th, 13th, 20th, 22d, 25th to 29th.
Iowa.—1st, 2d, 3d, 8th, 24th, 25th, 26th, 28th, 29th.
Kansas.—2d, 18th, 20th, 22d, 26th, 27th, 31st.
Kentucky.—20th, 22d, 26th.
Louisiana.—21st, 28th, 29th.
Maine.—1st, 4th, 5th, 23d, 24th, 27th.
Maryland.—27th.
Massachusetts.—3d, 22th, 27th.
Michigan.—1st to 4th, 7th, 8th, 10th, 22d to 27th, 29th, 30th, 31st.
Minnesota.—2d, 20th, 23d, 26th.
Mississippi.—28th.
Missouri.—2d, 25th.
Montana.—1st.
Nebraska.—1st, 2d, 7th, 21st, 23d, 24th, 26th to 31st.
Nevada.—26th, 27th.
New Jersey.—1st, 9th, 11th.
New Mexico.—22d, 28th.
New York.—1st, 3d to 6th, 9th, 11th, 12th, 21st, 23d, 26th to 29th, 31st.
North Carolina.—4th, 8th, 11st, 22d, 27th, 29th, 30th, 31st.
Ohio.—3d, 4th, 5th, 9th, 11th, 19th, 20th, 22d, 25th, 26th, 28th, 29th.
Oregon.—19th, 23d, 26th, 27th, 30th, 31st.
Pennsylvania.—3d, 25th, 26th.
Rhode Island.—3d, 23d.
South Carolina.—22d, 28th, 29th.
Tennessee.—2d to 5th, 21st, 29th.
Texas.—1st, 7th, 21st, 27th, 28th, 29th.
Utah.—1st, 27th.
Virginia.—1st, 4th, 8th, 9th, 22d, 23d, 27th to 31st.
Washington Territory.—24th, 27th.
Wisconsin.—2d, 23d, 24th, 26th, 27th.
Wyoming.—1st, 22d, 24th, 29th.

The phases of the moon during January were: full moon 1st, 12.20 a. m., and 30th, 11.13 a. m.; last quarter 7th, 10.31 p. m.; new moon 16th, 3.30 a. m.; first quarter 23d, 8.20 p. m.; perigee 28th, 8.42 p. m.; apogee 13th, 3.42 a. m.

MIRAGE.

Fort Maginnis, Montana, 1st: the whole country to the southeast appeared elevated above the horizon; the banks of the Missouri river, sixty-five miles distant, appearing with distinctness. On the 12th the entire western and southwestern horizon appeared to be elevated above its natural position and many objects not ordinarily visible were plainly seen.

Saint Vincent, Minnesota, 5th: the "Ridge," eighteen miles east of station, was plainly visible. On the 6th it was also visible, though less distinct. On the 7th a fine mirage was observed from 7.30 to 11.10 a. m., Bathgate and Hamilton, seventeen miles distant, and the "Ridge" being plainly visible. A mirage was also seen on the 28th.

The following stations also report mirage:

Vermilion, Dakota, 5th, 6th, 17th, 19th, 20th, 21st.
 Webster, Dakota, 7th, 23d, 29th.
 Genoa, Nebraska, 1st, 7th, 19th, 20th.
 San Francisco, California, 11th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul

weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and fifty-eight stations show 4,881 observations to have been made, of which three were reported doubtful; of the remainder, 4,878, there were 4,235, or 86.8 per cent., followed by the expected weather.

SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for January, 1885:

Date— Jan., 1885.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
2, 10 a. m.	1	151	0	0	0	0	3	71	
3, 12 m.	0	0	0	0	0	0	4	20	
5, 1 p. m.	0	0	0	0	0	0	4	20	
7, 12 m.	0	0	1	51	0	0	3	101	
13, 11 a. m.	0	0	0	0	0	0	1	51	
14, 12 m.	0	0	0	0	0	0	1	31	
17, 4 p. m.	1	71	0	0	0	0	2	101	
18, 12 m.	1	351	0	0	0	0	2	451	
19, 4 p. m.	0	0	0	0	0	0	2	401	
21, 2 p. m.	0	0	0	0	0	0	6	651	Many of spots very small.
23, 11 a. m.	1	1	0	0	1	1	6	651	Do.
26, 12 m.	0	0	0	0	0	0	7	451	Do.
27, 11 a. m.	0	0	1	51	0	0	6	401	Do.
29, 5 p. m.	1	2	0	0	1	2	5	301	
30, 12 m.	0	0	0	0	0	0	5	201	
31, 12 m.	1	3	0	0	1	3	5	251	

Faculae were seen at the time of every observation. 1 Approximated.
 Note.—75th meridian time is used.

EARTHQUAKES.

Professor C. G. Rockwood, jr., of Princeton, New Jersey, has forwarded the following notes on the earthquakes of January, 1885:

2d: At about 2 a. m. a very light shock, lasting five seconds occurred at Laconia, New Hampshire.

2d: At 9.12 p. m. (eastern time) a slight earthquake shock occurred in Frederick county, Maryland, and Loudon county, Virginia, and adjacent districts. It was most severe in the southern part of Frederick county, and affected an oval area whose boundary just includes Boonesborough and Newmarket, Maryland, Washington, District of Columbia, and Warrenton, Virginia. The noise accompanying the shock was compared to that made by a loaded wagon passing rapidly over frozen ground or over a bridge, to distant thunder, and to the roaring of a chimney on fire. The estimates of the duration of the shock as given by observers, were, as usual, very discordant, varying from two seconds to two minutes. As the tendency of ordinary observers is always to exaggerate this element, the unexpected and exciting nature of the phenomena making the time seem longer than it really is, probably ten or fifteen seconds would be a liberal estimate of the duration.

31st: at 5.05 a. m. low rumbling sounds, like distant thunder, followed by a perceptible trembling of the earth, startled residents of the northern towns of Westchester county, New York.

The following communication, published under the heading of "Letters to the editor," is taken from "Science" of January 30, 1885:

Supposing that reasonably exact determinations of the time and character of seismic phenomena are useful, I send the following note on the shock of January 2d at Washington:

I recognized the character of the shock at the instant of its occurrence and timed it. On the following day, comparing my watch with one set to the standard (not local) time adopted for this city, I found the shock occurred at 9 hours 16 minutes p. m., civil time, to which the correction to the Washington meridian is to be applied. My residence is close to Ascension church, on the highest land away from the boundaries of the city; the grade is ninety-two feet above mean level of the river, and two feet higher than the base of the Capitol. I was in the third story back room, facing east into the back yard, and south into an alley. The house is of brick, and above the middle of the second, story is isolated. The shock was a distinct and very heavy and sudden jar, not accompanied by noise, unless by a slight rattling of the windows, and lasted less than a second. The sensation was as if a very heavy body had struck the earth, yet also as if the jar were partly upward rather than downward. There was no second shock within fifteen minutes, although I saw a paragraph in the daily press to the effect that one individual alleges that he felt a second shock about 11 p. m. at Alexandria, Virginia.

W. H. DALL.

The "Philadelphia Record" of January 17th contained the following:

LEBANON, PA., January 16.—Yesterday morning at ten minutes past four o'clock an earthquake shock was distinctly felt at Shaefferstown. The shock

was felt by persons living in different houses, and furniture was jarred and seen to shake.

Mr. S. M. Luther, of Garrettsville, Portage County, Ohio, reports that during the early morning of the 18th a shock, supposed to have been due to an earthquake, occurred at that place. He also states that several persons in the vicinity of Garrettsville noticed the shock. The time at which it occurred was about 5.30 or 5.45 a. m.

The Signal Service observer at San Francisco, California, reports that at 4.33 a. m. (75th meridian time) on the 26th an earthquake shock was felt in the city and vicinity. The duration of the shock was about ten seconds and the vibration was apparently from east to west. A second shock was felt at 11.56 p. m. (75th meridian time) of the same date; it began with a slight tremulous motion which gradually increased in violence and terminated in a quick, sharp shock of three seconds duration. The vibration was apparently from north to south. The shocks were felt as far north as Napa and Petaluma.

San Rafael, Marin county, California, 26th: an earthquake occurred at 1.38 a. m., the vibration being from east to west, and at 8.56 p. m. another shock occurred, vibration from southwest to northeast.

Oakland, California, 26th: at 1.30 a. m. two shocks of earthquake occurred attended by a low rumbling sound; the direction of movement was from northeast to southwest or west. The second shock was a continuation of the first. At 8.56 p. m. on the same date, another shock occurred.

Sacramento, California: at 12.38 a. m. (75th meridian time), on the 31st, an earthquake shock occurred lasting several seconds; the direction of motion was from northeast to southwest.

Captain James Cooper, commanding the ship "Struan," from Panama to San Francisco, reports the following:

We left Panama on October 30th; on November 6th, in latitude N. 4° 17', W. 79° 40' (by account) the officer of the watch noticed a disturbance of the water—as in a tide-rip—close under the stern, and a few seconds later a shock was felt; it seemed as if the ship were bumping heavily on a sand bank, the shock being so severe that all hands came rushing on deck; it lasted about thirty seconds passing from southeast to northwest, and was followed about one minute later by a second shock of about twenty seconds duration, which caused the ship to tremble violently, but without any disturbance of the water.

The disastrous earthquakes which occurred in Spain during the closing days of December, were followed by numerous shocks in January; they are reported to have occurred during the night of the 1-2d, on the 2d, 5th, 12th, and during the night of the 17-18th. The following is from "The Philadelphia Times," of January 31, 1885:

WASHINGTON, January 30.—The consul of the United States at Malaga reports to the Department of State, in regard to the recent earthquakes in Spain, that fifty villages have been destroyed and two thousand lives have been lost. He also says that not less than thirty thousand persons have quitted the city of Malaga, and the rest of the people sleep in the open air. The death rate from disease has increased 300 per cent. At Joyena, a small river which ran through the town has entirely disappeared. At Albanuclos, the earth opened, swallowing the church and other buildings, so that nothing remains in sight but the weather-cock of the church spire. Two hundred bodies have already been taken from the ruins. At Velez Malaga, the prison, churches, convents, and city hall have all been leveled to the ground.

METEORS.

Meteors were observed at the following places during the month:

Sacramento, California, 18th.
Archer, Florida, 15th.
Vevay, Indiana, 13th.
Cedar Rapids, Iowa, 13th, 17th.
Allison, Kansas, 10th, 30th.
Richmond, Kentucky, 3d.
Woodstock, Maryland, 7th, 8th, 10th, 12th, 13th, 17th, 19th.
Rowe, Massachusetts, 13th.
Readington, New Jersey 10th.
Weldon, North Carolina, 11th.
Fort Dodge, Iowa, 20th.
Stateburg, South Carolina, 10th, 12th, 29th.

Strafford, Vermont, 5th.
Marion, Virginia, 7th.
Blacksburg, Virginia, 8th.
Sussex, Wisconsin, 17th.

POLAR BANDS.

Archer, Florida, 2d, 17th, 28th.
Riley, Illinois, 8th, 18th, 19th, 22d.
Guttenberg, Iowa, 2d.
Gardiner, Maine, 4th, 25th.
Amherst, Massachusetts, 19th.
Moorestown, New Jersey, 9th.
Mountainville, New York, 19th, 21st.
Wauseon, Ohio, 3d, 5th, 14th, 18th, 19th, 29th.
Providence, Rhode Island, 13th.
Point Judith, Rhode Island, 19th, 20th.
Stateburg, South Carolina, 17th, 29th.
Nashville, Tennessee, 2d, 3d, 5th.
Rio Grande City, Texas, 6th, 24th, 27th.
El Paso, Texas, 2d, 5th, 12th, 13th, 17th, 20th.
Dale Enterprise, Virginia, 3d, 14th, 18th, 23d.
Wytheville, Virginia, 3d, 14th, 19th, 23d, 29th.
Variety Mills, Virginia, 17th.

WATER-SPOUTS.

The brig "Lilian," H. F. Schive, master, in about N. 17° 52', W. 60° 10', on January 4th, saw a water-spout which remained visible about five minutes.

The s. s. "Nürnberg," A. Jaeger, commanding, in N. 38° 04', W. 71° 00', at 4 p. m. on January 22d, passed a water-spout.

MIGRATION OF BIRDS.

Geese flying southward.—Bismarck, Dakota, 5th; Kitty Hawk, North Carolina, 7th; Roseburg, Oregon, 5th; Austin, Tennessee, 25th; Lynchburg, Virginia, 11th.

Geese flying northward.—Augusta, Georgia, 29th; West Leavenworth, Kansas, 10th; Roseburg, Oregon, 11th.

PRAIRIE FIRE.

Fort Reno, Indian Territory, 2d.

NOTES AND EXTRACTS.

The following extract is from the January, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr.

January opened the year with most remarkable weather, noted for sudden and great extremes. Five cold waves passed over the state, previously predicted by the Chief Signal Officer with great accuracy. Comparatively few days of the month were mild and pleasant, as there were only three days without rain. The temperature was 5° below the normal, while the rainfall was about 4 inches above the average. Sections of the state suffered severely by the visitation of tornadoes on the afternoon and evening of the 11th. The destruction of life and property was great, and many singular and narrow escapes were made. This cyclonic condition occurred just after the low depression reported by the signal service in Nebraska, and the tornadic influences in Alabama were evidently due to the effort of the atmosphere to restore the equilibrium destroyed by this depression. This tornado was immediately followed by a reduction of temperature of from 15° to 20°.

The month generally has been unfavorable for farm and garden operations; the unusual amount of rainfall, accompanied by so much freezing weather, kept the soil in a condition unfavorable for ploughing or working. The early gardens are consequently very backward; oats are reported killed in some portions of the state.

State summary.

Mean temperature, 42°.8; highest temperature, 76° at Suggsville on the 15th; lowest temperature, 7° at Tuscombina on the 22d; range of temperature, 69°; greatest monthly range of temperature, 66° at Clintonville; least monthly range of temperature, 41° at Chattanooga; mean daily range, 11°; greatest daily range of temperature, 41° at Edwardsville on the 17th; least daily range of temperature, 0° at Fayette on the 24th.

Mean depth of rainfall, 8.61 inches; mean daily rainfall, 0.278 inch; greatest depth of monthly rainfall, 12.32 inches at Clintonville; least depth of monthly rainfall, 6.25 inches at Carrollton; greatest daily rainfall, average for the state, 1.28 inches, on the 23d; greatest daily rainfall, 4.07 inches at Clintonville on the 23d.

Days of general rainfall, 5th, 11th, 16th, 23d, 24th; average number of days on which rain fell, 10; average number of cloudy days, 16; average number of fair days, 8; average number of clear days, 7; warmest days, 15th and 16th; coldest days, 2d, 17th, 18th, and 22d.